Attorney Docket: 1674/43755CO
PATENT

#19
Revise Appeal Brief
2-18-04

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: WESLEY WILKINSON

Serial No.: 09/915,570 Group Art Unit: 3618

Filed: JULY 27, 2001 Examiner: Christopher Bottorff

Title: CONTROL WHEEL ASSEMBLY FOR TROLLEYS

REVISED APPEAL BRIEF

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Commissioner for Patents
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Sir:

On June 30, 2003, Appellants appealed to the Board of Patent Appeals from the final rejection of claims 21-59. The following is Appellants appeal brief submitted pursuant to 37 C.F.R. 1.192.

REAL PARTY IN INTEREST

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RELATED APPEALS AND INTERFERENCES

There are no interferences known to Appellant or Appellant's legal representative which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending Appeal.

STATUS OF CLAIMS

This application currently contains claims 21-59 which are being appealed.

STATUS OF AMENDMENTS

Subsequent to the final Patent Office Action of January 28, 2003, an Amendment was filed on May 28, 2003, which was not entered as indicated in the Advisory Action of June 11, 2003. Accompanying this Appeal Brief is an Amendment which corrects the dependency of claim 51 so that it now properly depends from Claim 31.

SUMMARY OF THE INVENTION

The control wheel assembly for a trolley and a trolley fitted with such an assembly uses a central control wheel assembly as defined by independent claims 21, 22, 30, 31, 36 and 41-47. Each of these claims concern an assembly which provides controlled contact with the surface by using a fixed wheel and either a biasing means and damping means or more particularly a strut assembly for the wheel which functions as both the biasing means and damping means.

The impetus for the present invention is the recognition that there was a need for light trolleys or carts to have a constant force for a control wheel because traction requirements of the vertical position of a control wheel for such trolleys are a substantial function of the mass of the trolley. Accordingly, lighter

trolleys must have a constant force regardless of the vertical travel or position of the control wheel so that the control wheel will function properly regardless of whether the trolley is loaded or unloaded.

The present invention determines that the required characteristics of a control wheel to correct wheel dynamics is based on the design for a mechanism which generates correct constant force through a specific gas strut design, in particular combined with an appropriate fixed telescopic column (non-rotating) and a fixed direction wheel. The use of a gas strut is based on the recognition that a gas strut can have linear characteristics and its specific force results from a specific design and the ability to fill it to any pressure. The ability to have these trolley assemblies with a constant force necessarily implies that that force is constant regardless of the travel below a contact surface. In other words, it remains constant whether the trolley is on a trough or a dip in the control surface.

The present invention therefore results from the application of a gas strut to a fixed wheel which is a combination for a trolley arrangement or assembly for a trolley which has not been disclosed in the prior art.

ISSUES

The first issue to be decided by the Board of Appeals is whether claims 21-59 are anticipated under 35 U.S.C. § 102 by the reference to Fullenkamp et al., U.S. Patent No. 5,348,326. A second issue to be considered by the Board of

Appeals is whether claims 21-59 are properly rejected under 35 U.S.C. § 103 as unpatentable over the reference to Lloyd, British Patent GB 2,232,386 in view of admitted prior art (Stabilus Gas Springs Technical Information).

GROUPING OF THE CLAIMS

Appellants submit that claims 22-29, 35 and 45-57 do not stand or fall together with respect to either the rejection under 35 U.S.C. § 102 or the rejection under 35 U.S.C. § 103.

ARGUMENTS

The Rejection of Claims 21-59 Under 35 U.S.C. § 102 as Anticipated by Fullenkamp

Appellant's traversal of this rejection is based on the existence of features within each of independent claims 21, 22, 30, 31, 36 and 41-47 which are not shown or disclosed by the reference to Fullenkamp.

According to the statement of the final rejection, Fullenkamp discloses a trolley with a control wheel assembly having four castors disposed at the corners of the trolley and with a fixed wheel 44 and a second wheel 46 both positioned in a region where the load center of the trolley and the center of the castors coincide. It is stated that the fixed wheel rotates about a horizontal axis and cannot rotate about a vertical axis. Column 2, lines 29-31 has been indicated as showing a gas strut provided with each fixed wheel and that the force of the bias means does not exceed the weight of the empty trolley and a lifting means for

lifting the fixed wheel out of contact with the ground and that the traction force requirements for a vertical position of the fixed wheel are a substantial function of the mass of the trolley.

Appellants submit that the reference to Fullenkamp discloses a mechanism which provides a fixed or controlled wheel for hospital beds. Fullenkamp uses a spring but does not have a gas strut. Furthermore, column 2, lines 29-31 of Fullenkamp concern the use of a gas spring with a "swing arm mechanism" but not with a "fixed wheel" as claimed in Applicants independent claims. Additionally, the gas spring of Fullenkamp is not co-linear with the line of vertical travel of the control wheel and cannot thus provide controlled contact between the fixed wheel and the surface and cannot provide that the force is independent of the load on the trolley or that the force does not exceed the weight of the trolley.

Appellants submit that the claimed arrangement of a gas strut to provide controlled contact between the fixed wheel and the surface on which the trolley travels is not disclosed by Fullenkamp. This claimed arrangement of the present invention solves the problem of light trolleys providing a constant force regardless of the weight of the trolley. The claims set forth the use of such a strut in combination with the fixed wheel to provide controlled contact. This claim combination is not disclosed by Fullenkamp.

The Rejection of Claims 21-57 Under 35 U.S. C.§ 103 as Unpatentable Over Lloyd in View of the Admitted Prior Art (Stabilus Gas Springs Technical Information)

Appellants traversal of this rejection is based on the existence of features which are not obvious in light of any combination of reference to Lloyd and the admitted prior art.

According to the statement of the rejection in the final Action, Lloyd has a fixed wheel 34 which rotates around horizontal axis 35 and a strut assembly in provided having a first part 36 connected to a member which rotatably supports the fixed wheel at axis 35 and a second part 39 which is fixed to the trolley. There is furthermore indicated to be a biasing and damping means 43 provided with the fixed wheel.

The reference to Lloyd does not have a gas strut.

According to the statement of the final rejection it would have been obvious to one of ordinary skill in the art to replace the spring of Lloyd with the admitted prior art gas strut in order to provide counterbalance and force assistance to the fixed wheel.

Appellants submit that the guide wheel 34 of Lloyd function so that there is only upward travel for the guide wheel 34. Its design would not function when the trolley encountered a trough because the wheel could not follow the surface if the surface passed below the horizontal plane. As indicated at page 5, lines 3-5

of Lloyd, the guide wheel is "normally intended for ground engagement in the common plane of the front and rear wheels".

One of the critical design aspects for designing carts or trolleys is the normal force N in conjunction with the coefficient. The normal force N must be sufficient to provide traction to the tire interface and prevent slippage. However the force N must not exceed the force which would lift the empty trolley off the ground. This force N must also not be exceeded throughout the control wheel vertical travel so that any empty or unladen trolley cannot traverse humps or crests because the control wheel is not able to move vertically relative to the trolley if the normal force is too large. The present invention is based on the recognition of the importance of the normal force N and mainly the fact that it must be maximized at the point just before an empty trolley lifts off the ground. This requirement implies that the force is relatively constant over the vertical travel which is not achievable with mechanical springs where the force increases proportionally to travel in a non-linear relationship as, for example, in the mechanical spring used in Lloyd or in the above discussed reference to Fullenkamp.

Accordingly, this recognition of the importance of the normal force is what led to applicants claimed invention of using a gas strut to provide this normal force N. As discussed above, it is also recognized by Appellants that the gas strut provides a nearly linear force relationship while coiled springs cannot

provide the required constant force range throughout the entire ranged of required travel.

When a spring is compressed it quickly exceeds the force maximum required to use the empty trolley without lifting it off the ground. At full travel the spring provides a force which is substantially double to that which is required. In order the exemplify this, at the extended end of the range, the force may be sufficient however, as the spring is compressed when traversing a crest, the force increases non-linearly to the point where it easily exceeds the maximum force required to lift the unloaded trolley off the ground. To achieve the substantially linear force-travel relationship with a spring, a very small range of movement of a very long spring would be required which is not a practical application. In direct contradistinction, the ability to be able to specify the force characteristics of a gas strut is also advantageous because the one strut can be used to satisfy a number of different trolley designs whereas different springs need to be manufactured for each application even if they could be fitted into the vertical dimensions required for trolleys.

The gas strut also provides damping to control the extension direction of the travel and prevents wheel bounce.

The guide wheel of Lloyd is part of a swing arm system which addresses the issue of lateral movement whereas the presently claimed invention addresses the dynamic performance issues by providing a correct function whether the trolley is loaded or unloaded and providing controlled contact with

the surface even through the ramps, crests or dips. Such a system is economical to fit into trolleys during the manufacture and is specifically tuned to the particular trolley requirements by specifying the amount of travel and the force of the gas strut.

Appellants claimed invention is a combination and does not involve the invention of a fifth wheel alone or of a gas strut but instead involves a recognition of control wheel dynamics and the subsequent design to generate correct constant force by providing the critical strut force for light trolleys with an appropriate non-rotating telescopic column and fixed direction wheel of high-friction coefficient material. The prior art does not show this combination. The prior art including Lloyd and the above discussed reference to Fullenkamp simply reduce the force of a spring until it didn't create any problems for an empty trolley with the result that the control wheel had insufficient force at every position other than the maximum travel of the control wheel. The present invention has a control wheel which has the correct force at all positions of vertical travel and the mechanism of Lloyd, as discussed above, does not have any provision for traveling below the contact surface and therefore would not control the trolley on a trough or a dip in the control surface.

These problems were solved by using a gas strut which provides for control over the entire range or movement in the vertical direction of the control wheel and it is submitted that one skilled in the art looking at the problems solved by Lloyd would not have any reason to assume that the device could be

improved for its designed purpose by using a gas strut. It is the recognition of dynamic control problems over the course of travel and over a surface not contemplated in the disclosure of Lloyd which led Appellants to determine that the gas strut would solve dynamic problems still remaining in the area of cart technology.

It is also important to recognize that a gas strut is substantially different from a spring. Struts perform a damping function such as a shock absorber and are velocity sensitive meaning that they are valved so that the amount of resistance can increase or decrease depending on how fast the suspension moves and how far it moves.

Aside from incorporating features of claim 21, the dependent claims 23-29 each have separate patentability over the prior art because they specify features concerning the force of the biasing means being independent of the load on the trolley and other restrictions on the force and the biasing means as well as the rotation of the fixed wheel which are additional features not disclosed by Fullenkamp. Dependent claim 35 is separately patentable over the prior art as it recites a lifting means to lift the wheel of the control assembly out of contact with the travel surface which is not shown by Fullenkamp. Independent claim 45 is separately patentable over the prior art as it recites a plurality of the fixed wheels where each of the wheels having the gas strut is independent of any other wheel, which is not disclosed by Fullenkamp. Independent claim 46 is separately patentable over the prior art as it recites a castor wheel on each side

of the self-contained gas strut which is not shown by Fullenkamp. Independent claim 47 is separately patentable over the prior art with respect to the recitation of two gas struts independent of the castors which each are coupled to a fixed wheel which is not disclosed by Fullenkamp. Dependent claim 48 is separately patentable over the prior art as it recites traction force requirements for a vertical position of the fixed wheel being a substantial function of the mass of the trolley which is not shown by Fullenkamp. Likewise claims 49-59 are separately patentable over the prior art which fails to teach a recitation of the traction force requirements.

APPENDIX

An appendix containing a copy of the claims is attached hereto.

CONCLUSION

Therefore in view of the distinction featured between the claimed invention and the references as discussed above, Applicants respectfully request that the decision of the Examiner in finally rejecting claims 21-59 should be REVERSED.

The amount of $320.00 in payment of the required appeal fee was previously paid on October 30, 2003. This amount is believed to be correct, however, the Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, to Deposit Account No. 05-1323 (Docket #037076.43755CO). **A triplicate copy of this Appeal Brief is attached.**

Respectfully submitted,

January 23, 2004

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APPENDIX

21. A trolley control wheel assembly adapted to be fitted to a trolley having a longitudinal axis of travel and an array of castors having respective castor wheels, said assembly comprising:

a fixed wheel adapted to be disposed in use on a trolley in a vicinity of one of a load center of the trolley and a center of the array of castors, and

a self-contained gas strut independent of the castors and operable to provide controlled contact between the fixed wheel and a surface on which the trolley is intended to travel.

22. A trolley control wheel assembly adapted to be fitted to a trolley having a longitudinal axis of travel and an array of castors, said assembly comprising:

a fixed wheel in the vicinity of the load center of the trolley or the center of the array of castors, and

a bias means and a damping means to provide controlled contact between the fixed wheel and a surface on which the trolley is intended to travel, wherein the

bias means and the damping means jointly comprise a self-contained gas strut independent of any other wheel.

23. A trolley control wheel assembly as claimed in Claim 22, wherein the load center of the trolley and the center of the array of castors coincide.

24. A trolley control wheel assembly as claimed in Claim 22, wherein a force of the bias means is independent of a load on the trolley.

25. A trolley control wheel assembly as claimed in Claim 22, wherein a force of the bias means does not exceed the weight of an empty trolley.

26. A trolley control wheel assembly as claimed in Claim 22, wherein the bias means is biased downwards towards the surface on which the trolley is intended to travel.

27. A trolley control wheel assembly as claimed in Claim 22, wherein the trolley has four castors disposed in the vicinity of the corners of the trolley.

28. A trolley control wheel assembly as claimed in Claim 22, wherein the fixed wheel rotates about a horizontal axis but cannot rotate about a vertical axis.

29. A trolley control wheel assembly as claimed in Claim 21, wherein in order to facilitate lateral maneuvering of a trolley, said wheel assembly further comprises a lifting means to lift the fixed wheel of the control wheel assembly out of contact with a travel surface to enable the trolley to be readily moved at right angles to a desired direction of movement or travel.

30. A trolley having a longitudinal axis of travel, comprising:

an array of castors fitted thereto, and

a trolley control wheel assembly comprising:

a fixed wheel fixed at a position in the vicinity of a load center of the trolley or a center of the array of castors; and

a bias means and a damping means to provide controlled contact between the wheel and a surface on which the trolley is intended to travel, wherein the bias means and the damping means jointly comprise a self-contained gas strut independent of any other wheel.

31. A cart having a longitudinal axis of travel, comprising:

an array of castors fitted thereto, and

a trolley control wheel assembly which comprises:

a fixed wheel adapted to be disposed in use on a trolley in a vicinity of one of a load center of the trolley and a center of the array of castors, and

a self-contained gas strut independent of the castors and operable to provide controlled contact between the fixed wheel and a surface on which the trolley is intended to travel.

32. A trolley as claimed in Claim 30, wherein the load center of the trolley and the center of the array of castors coincide.

33. A trolley as claimed in Claim 30, wherein a force of the bias means is independent of a load on the trolley.

34. A trolley as claimed in Claim 30, wherein the trolley has four castors disposed in the vicinity of the corners of the trolley.

35. A trolley as claimed in Claim 30, wherein in order to facilitate lateral maneuvering of a trolley, said wheel assembly further comprises a lifting means to lift the wheel of the control wheel assembly out of contact with a travel surface to enable the trolley to be readily moved at right angles to the customary desired direction of movement or travel.

36. A trolley having a longitudinal axis of travel and having an array of castors on which the trolley can be moved from place to place in a general direction of the longitudinal axis of the trolley, the improvement which comprises:

a control wheel assembly comprising a fixed wheel fixed at a position in the vicinity of a load center of the trolley or a center of the array of castors and a bias means and a damping means to provide controlled contact between the wheel and a surface on which the trolley is intended to travel, wherein the bias means and the damping means jointly comprise a self-contained gas strut independent of any other wheel.

37. A trolley as claimed in Claim 36, wherein the load center of the trolley and the center of the array of castors coincide.

38 A trolley as claimed in Claim 36, wherein a force of the bias means is independent of a load on the trolley.

39. A trolley as claimed in Claim 36, wherein the trolley has four castors disposed in the vicinity of the corners of the trolley.

40. A trolley as claimed in Claim 36, wherein in order to facilitate lateral maneuvering of a trolley, said wheel assembly further comprises a lifting means to lift the wheel of the control wheel assembly out of contact with a travel surface to enable the trolley to be readily moved at right angles to a desired direction of movement or travel.

41. A castored trolley control wheel assembly which includes a fixed wheel, a bias means and a damping means to provide controlled contact between the wheel and a surface on which the trolley is intended to travel, wherein the bias means and the damping means jointly comprise a self-contained gas strut independent of any other wheel.

42. A trolley control wheel assembly adapted to be fitted to a trolley having a longitudinal axis of travel and an array of castors, said assembly comprising a plurality of wheels fixed in the vicinity of a load center of the trolley or a center of the array of castors, each wheel having a bias means and a damping means to provide controlled contact between the fixed wheel and a surface on which the trolley is intended to travel, wherein the bias means and the damping means jointly comprise a self-contained gas strut independent of any other wheel.

43. A trolley having a longitudinal axis of travel, comprising:

an array of castors fitted thereto, and

a trolley control wheel assembly comprising a plurality of wheels fixed at a position in the vicinity of a load center of the trolley or a center of the array of castors, each wheel having a bias means and a damping means to provide controlled contact between the wheel and a surface on which the trolley is intended to travel, wherein the bias means and the damping means jointly comprise a self-contained gas strut independent of any other wheel.

44. A trolley having a longitudinal axis of travel and having an array of castors on which the trolley can be moved from place to place in a general direction of the longitudinal axis of the trolley or otherwise, the improvement which comprises:

a control wheel assembly comprising a plurality of wheels fixed at a position in the vicinity of a load center of the trolley or a center of the array of castors, each wheel having a bias means and a damping means to provide controlled contact between the wheel and a surface on which the trolley is intended to travel, wherein the bias means and the damping means jointly comprise a self-contained gas strut independent of any other wheel.

45. A castored trolley control wheel assembly which includes a plurality of fixed wheels, each wheel having a bias means and a damping means to provide controlled contact between the wheel and a surface on which the trolley is intended to travel, wherein the bias means and the damping means jointly comprise a self-contained gas strut independent of any other wheel.

46. A trolley control wheel assembly adapted to be fitted to a trolley having a longitudinal axis of travel and an array of castors having respective castor wheels, said assembly comprising:

a fixed wheel adapted to be disposed in use on a trolley; a self-contained gas strut independent of the castors and operable to provide controlled contact between the fixed wheel and a surface on which the trolley is intended to travel; and

a castor wheel on each side of the self-contained gas strut.

47. A trolley control wheel assembly adapted to be fitted to a trolley having a longitudinal axis of travel and an array of castors having respective castor wheels, said assembly comprising:

two fixed wheels, each fixed wheel adapted to be disposed in use on a side of a trolley chassis;

two self-contained gas strut independent of the castors, wherein each self-contained gas strut is coupled to a fixed wheel and is operable to provide controlled contact between the fixed wheel and a surface on which the trolley is intended to travel.

48. The trolley control wheel assembly according to claim 21, wherein traction force requirements for a vertical position of said fixed wheel are a substantial function of a mass of the trolley.

49. The trolley control wheel assembly according to claim 22, wherein traction force requirements for a vertical position of said fixed wheel are a substantial function of a mass of the trolley.

50. The trolley according to claim 30, wherein traction force requirements of the trolley related to a vertical position of said fixed wheel are a substantial function of a mass of the trolley.

51. A cart according to claim 31, wherein traction force requirements with respect to a vertical position of said fixed wheel are a substantial function of a mass of the cart.

52. The trolley according to claim 36, wherein traction force requirements concerning a vertical position of the fixed wheel are a substantial function of a mass of the trolley.

53. The control wheel assembly to claim 41, wherein the traction force requirements concerning a vertical position of the fixed wheel are a substantial function of mass of a trolley.

54. The control wheel assembly according to claim 42, wherein traction force requirement concerning a vertical position of the plurality of wheels are a substantial function of a mass of the trolley.

55. The trolley according to claim 43, wherein traction force requirements concerning a vertical position of said plurality of wheels are a substantial function of a mass of the trolley.

56. The trolley according to claim 44, wherein traction force requirements concerning a vertical position of said plurality of wheel are a substantial function of a mass of the trolley.

57. The trolley according to claim 45, wherein traction force requirements concerning a vertical position of said plurality of wheels are a substantial function of a mass of the trolley.

58. The control wheel assembly according to claim 46, wherein traction force requirements concerning a vertical position of the fixed wheel are a substantial function of a mass of the trolley.

59. The trolley control wheel assembly according to claim 47, wherein traction force requirements concerning a vertical position of said two fixed wheels are a substantial function of a mass of the trolley.

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